

## HUMAN RESOURCES FOR TREATING NEW CANCER CASES IN INDONESIA

### Executive Summary

The purpose of this report is to describe the human resources needed in Indonesia to treat new cancer patients. The population of Indonesia is approximately 244.77 million (122.01 million men and 122.76 million women) and the estimated number of new cancer cases in Indonesia for the year 2012, based on GLOBOCAN data (<http://globocan.iarc.fr/>) for Indonesia as a whole was 299673 (138840 in men and 160833 in women) (Table A).

The five most common cancers in Indonesia are (1) breast, (2) gynecological (cervix uteri, corpus uteri and ovary), (3) lung, (4) head and neck (lip, oral cavity, nasopharynx, other pharynx, larynx and thyroid) and (5) colorectal.

Table A: The ten most frequently occurring cancers in Indonesia for men and women based on 2012 GLOBOCAN data.

Cancer	BOTH SEXES		MEN		WOMEN	
	Incidence	Rank	Incidence	Rank	Incidence	Rank
All cancers excl. non-melanoma skin cancer	299673		138840		160833	
Breast	48998	1			48998	1
Gynecological	37641	2			37641	2
Lung	34696	3	25322	1	9374	6
Head and Neck	30920	4	18180	3	12740	3
Colorectal	27772	5	15985	4	11787	4
Hematological	26654	6	15217	5	11437	5
Urological	25542	7	23137	2	2405	9

Liver	18121	8	13365	6	4756	7
Stomach	6011	9	3811	7	2200	11
Pancreas	5829	10	3011	8	2818	8
Brain, nervous system	4903	11	2584	9	2319	10
Esophagus	2191	12	1513	10	678	13

Newly diagnosed cancer patients need pathology, surgery, chemotherapy and/or radiation therapy. The number of oncologists needed is based, therefore, on the number of patients requiring pathology, surgery, chemotherapy and radiation therapy (Table B). This number is estimated from the percentage of patients requiring surgery, chemotherapy and/or radiation therapy for the top ten cancers in both men and women.

For developing countries the International Atomic Energy Agency (IAEA) recommends training Radiation/Clinical Oncologists who can prescribe both radiation and chemotherapy for the common solid cancers, instead of separate medical and radiation oncologists. Hematological malignancies are treated primarily by hematologist-oncologists. The number of specialists needed is based upon the number of cancer patients but each city, in order to ensure coverage if one person leaves or goes on vacation, must have at least 2 surgical oncologists, 2 radiation/clinical oncologists, 2 hematologist oncologists, etc.

Table B: Number of Oncologists needed for Indonesia's 2 most populous cities based on 2010 population estimates (<http://citypopulation.de/>) and 2012 GLOBOCAN data for new cancer cases.

	Population	New Cancer Cases	Hematologist Oncologists	Surgical Oncologists	Radiation / Clinical Oncologists	Urologic Oncologists	Gynecologic Oncologist	Pathologists
Jakarta	9607787	11763	3	11	59	3	3	24
Surabaya	2765487	3386	2 <sup>✧</sup>	3	17	2 <sup>✧</sup>	2 <sup>✧</sup>	7

<sup>✧</sup>At least 2 are needed in each city.

In addition to oncologists, support staff such as onco-pharmacists, pharmacy technicians, oncology nurses and palliative care specialists is also needed. Many cancer patients require hospitalization for diagnosis, treatment and/or complications, therefore an adequate number of oncology beds will be needed. The number of oncology nurses, onco-pharmacists and pharmacy technicians needed is based upon the number of beds occupied daily by cancer patients while the number of palliative care specialists is based on the number of new cancer cases per year (Table C). The oncology nursing staff for each 24-bed oncology unit (operating 24 hours a day, 7 days a week) comprises of one head nurse and a nurse specialist as well as 13 nurses working 8 hour shifts, 5 days per week.

Table C: Number of Oncology Units, Nursing and Pharmacy Staff needed for Indonesia's 2 most populous cities based on 2010 population estimates and 2012 GLOBOCAN data for new cancer cases.

	<b>New Cancer Cases</b>	<b>Maximum # of beds/day</b>	<b># of 24 bed oncology wards</b>	<b>Onco-Pharmacists</b>	<b>Onco-Pharmacy Technicians</b>	<b>Palliative Care Specialists</b>	<b>Oncology Nursing Staff other than Radiation Oncology Nurses</b>
Jakarta	11763	194	9	36	54	24	135
Surabaya	3386	56	3	12	18	7	45

Since many cancer patients require radiotherapy, appropriately equipped facilities will be needed along with radiation oncology staff (Tables D and E). Radiation oncology staff includes radiation therapy technicians, medical physicists, Linac engineers and radiation oncology nurses in addition to radiation/clinical oncologists. The minimum radiation therapy equipment requirements are at least one of each: Linac, brachytherapy unit, CT simulator, treatment planning computer and dosimetry/quality assurance package.

Table D: Radiation Therapy Staff needed for Indonesia's 2 most populous cities based on 2010 population estimates and 2012 GLOBOCAN data for new cancer cases.

	<b>New Cancer Cases</b>	<b>Radiation / Clinical Oncologists</b>	<b>Radiation Therapy Technicians</b>	<b>Medical Physicists</b>	<b>Linac Engineers</b>	<b>Radiation Oncology Nurses</b>
Jakarta	11763	59	74	25	7	25
Surabaya	3386	17	22	8	2	8

Table E: Radiation Therapy Equipment needed for Indonesia's 2 most populous cities based on 2010 population estimates and 2012 GLOBOCAN data for new cancer cases.

	<b>New Cancer Cases</b>	<b>Linacs / Co 60 Megavolt Units</b>	<b># of Brachytherapy units</b>	<b># CT simulators</b>	<b># of treatment planning computers</b>	<b># of dosimetry/QA package</b>
Jakarta	11763	13	7	7	7	7

Surabaya	3386	4	2	2	2	2
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NOTE: Guidelines from the IAEA of the United Nations were used to calculate the radiation therapy equipment and staff needed in the setting of a developing country. Guidelines from the Oncology Nursing Society were used to calculate the number of nurses needed. Several other specialty societies were also requested to provide guidelines but in most cases there were none, therefore colleagues active in those fields were consulted for estimating the number of staff needed.